

## **Aeolian Geomorphology of the Salt Basin, West Texas**

V.P. Tchakerian, Department of Geography and Geology & Geophysics, Texas A&M University, College Station, Texas 77843 (vatche@geog.tamu.edu)

P.R. Rindfleisch, Department of Geography, Texas A&M University, College Station, Texas 77843 (soilgeo18@hotmail.com)

J. Given, Department of Geography, Texas A&M University, College Station, Texas 77843 (jgiven@tamu.edu)

D.E. Wilkins, Department of Geosciences, Boise State University, Boise, Idaho 83725 (dwilkins@boisestate.edu)

### **Introduction**

This paper examines the aeolian processes and landforms of the Salt Basin in West Texas. The Salt Basin, a northwest-southeast trending faulted block, covers an area of 22,000 km<sup>2</sup> and is located about 160 km east of the city of El Paso. Two major types of aeolian deposits mantle the study site: (1) quartz based sand dunes and sheets and (2) gypsum based dunes. The quartz based dunes and sands consist of two major sub-types: (a) older stabilized aeolian deposits (two to three depositional units) seen only in arroyo exposures and, (b) more recent nebkha dunes, interspersed with cryptobiotic soils. Based on stratigraphy and radiocarbon dating from a number of arroyo exposures and on geomorphic and granulometric studies from the nebkhas and the gypsum dunes, the oldest aeolian units were most likely deposited during the mid-Holocene (about 6400 yr BP) and rest on top of older carbonate-cemented, gypsum-sand aeolianites and fanglomerates. From the mid-Holocene through late-Holocene time (c. 400 BP), a number of major aeolian depositional pulses are recognized, terminating with the stabilization of the quartz-based dunes and the formation of nebkhas with cryptobiotic soils. Present aeolian activity is limited to the gypsum dunes and controlled primarily by evaporative pumping of groundwater and surface production of gypsum, as well as to the deflation of existing gypsum dunes owing to anthropogenic activities such as grazing and other agricultural activities. The highly episodic nature of aeolian activity seems to be controlled largely by sediment supply, availability, storage and transport capacity, and only to a lesser degree to periods of aridity (such as the Altithermal) and/or variations in wind regime.